FOUR NEW TETRANYCHIDS.

By E. A. McGregor, Bureau of Entomology.

The following species of phytophagus mites from the Southeast are of considerable economic importance and are herein described for the first time.

Tenuipalpus bioculatus sp. nov.

Female. Body crimson, with two rather well-defined eye-like spots on cephalothorax. Widest at posterior corners of cephalothorax, two-thirds as wide as long. The cephalothorax is narrowed considerably anteriorly, and the abdomen tapers to a rounded tip. The body is armed with a pair of weak spines on the anterior body margin medially, similar spines immediately before and behind the emarginate eyes, six at the posterior tip of the abdomen, a few along the body margin, and scattered ones dorsally. The cephalothorax is hardly half as long as broad, with the anterior margin convex; the palpi greatly resembles the *Tetranychus* type, the penultimate joint bears a strong claw, and the terminal joint (thumb) bears a "finger". The legs are relatively

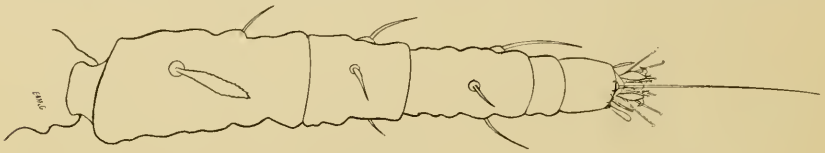


Fig. 1.

Tenuipalpus bioculalus. Right leg I, dorsal view (enlarged 650 times).

stout, crenulated; forelegs in length three-quarters the width of cephalothorax; four anterior tarsi blood-red in life; all legs bearing several lateral hairs, and a terminal bristle in length equalling the three distal segments; the trochanter of the four anterior legs with a lamellate hair placed dorsally; the tarsi with several terminal appendages including a pair of closely appressed claws, a very long bristle, and the four capitate hairs, so frequently seen in *Tetranychus*.

Length, 0.235 mm.; width (hind margin of cephalothorax), 0.149 mm.

The egg is thickly elliptical in linear outline, and measures .096 mm. by .067 mm. It is blood red in color from the first. The eggs are deposited with the long axis perpendicular to the leaf, closely packed (like those of Coccinellids), often comprising clusters of several hundred.

Type No. 19090, U. S. Nat. Mus.

NOTES.

The six posterior spines are much more conspicuous in the younger stages of the larva than in the adult. The molt takes place through a transverse rupture (at the suture between the

cephalothorax and abdomen) quite similar to that of the red-spiders. The male is decidedly smaller than the female, and the abdomen is suddenly constricted behind the cephalothorax and decidedly more attenuate than is the case with the female. The legs of the male are relatively longer, colorless, and the hairs and bristles are more conspicuous.

From Batesburg, South Carolina, on privet (*Ligustrum amurense*), *Rumex acetosella*, *Oxalis stricta* and garden mint (*Mentha spicata*), collected by Mr. F. L. McDonough and the writer, and from Baton Rouge, La., on privet and strawberry, collected by Prof. E. S. Tucker. At Batesburg this pest has been observed frequently to inflict severe damage to privet hedges. Several adjacent bushes are often entirely defoliated which may result in the death of several yards of hedge. The pest attains its greatest abundance and destructiveness during the fall months. Several insecticides were thoroughly tested during the present (1914) season against this species. Schnarr's Insecticide gave complete mortality, with lime-sulphur practically as good. Following are the results of the test.

SPRAYS	MORTALITY
Schnarr's Insecticide	100%
Lime-sulphur (Thomsen Chem. Co.)	99%
Potassium sulphid	90%
"Blackleaf 40"	Less than 5%

Tetranychus yothersi sp. nov.

Predominating color a rusty-red, arising mainly from large internal structures occurring on each side and connected centrally by a narrow isthmus, a shield- or saddle-shaped pale pinkish-amber area includes most of the cephalothorax; a narrow clear or translucent area extends medially from behind almost to the thoracic suture. Eyes crimson, each set at inner border of a groove overlying coxæ I and II. Coxæ and femora of a greenish hue; tibiæ I and tarsi I salmon-color. Palpi salmon-color. Dorsal bristles colorless, not arising from tubercles. Body of female sphero-elliptical, widest equatorially: male subcuneate, widest across cephalothorax which is somewhat truncate in front, abdomen tapering to acute point posteriorly: bristles in four rows, averaging in length two-fifths the width of the body. Mandibular plate less than twice as long as broad, somewhat tapering anteriorly with a distinct emargination. "Thumb" of palpus much reduced longitudinally, bearing at its tip a relatively large, slightly clavate "finger" whose base is almost as wide as the tip of the "thumb"; on its upper distal corner are two pseudo-fingers, not greatly thicker than hairs, on upper side about midway to base is a small "finger" and

between this and base are two short stout hairs; the claw on the penultimate joint reaches to the middle of the "thumb"; a hair arises laterally from the center of the "thumb", and another from a similar position on the penultimate joint. The legs are relatively short, barely as long as width of body; femur only half again as long as wide—exactly equalling tarsus, tibia a trifle longer than patella which equals the trochanter: tip of tarsus bears a claw which is nearly straight for two-thirds its length and then bent to nearly a right angle; a second claw, arising from the other at its point of origin from the onychium, is almost straight and forms with the first an obtuse angle; four strong spurs (corresponding to the usual 4-cleft claw) have their origin in common with the claws; the usual series of four capitate hairs arise by the sides of the claws from the tip of the onychium.

The egg is globose-lenticular and bears a stalk which varies in development from a length equalling the height of the egg to a mere rudimentary papilla; guy fibrils are occasionally seen connecting the egg with the leaf; the color is smoky-amber.

Type No. 19088, U. S. Nat. Mus.

The type material is from Orlando, Florida, August 28, 1914, from the upper surface of camphor leaves, collected by W. W. Yothers. The species is evidently nearest *T. mytilaspidis*, Riley, from which it is easily distinguished through its lack of dorsal tubercles, marked difference in the detail of the palpal characters, emarginate mandibular plate, entirely different proportion one to the other of the leg joints, and through the novel arrangement of the tarsal appendages.

An extensive series of measurements of material on Eucalyptus and camphor from Florida, and on oak, elm and pecan from South Carolina have yielded the following averages:

ADULTS

	LENGTH (not including palpi)	WIDTH	FORELEG
Female	.307 mm.	.237 mm.	.232 mm.
Male	.225 mm.	.152 mm.	.222 mm.

EGG

DIAMETER	HEIGHT	STALK (when well developed
.127 mm.	.082 mm.	.077 mm.

NOTES.

It is of interest to record that, whereas the common red-spiders have long been known to feed almost exclusively on the under surface of the leaf, this species confines its activities entirely to the top of the leaves.

To date, the species has been recorded upon camphor (*Camphora officinale*) and *Eucalyptus* sp. at Orlanda, Florida, and upon two varieties of elm, the willow oak (*Quercus phellos*), the white oak (*Quercus alba*), and the pecan at Batesburg, South Carolina. Mr. Yothers states that at cetrain times it is everywhere present on the camphor tree causing a reddening of the leaves and a reduced vitality of the tree.

The species has been exceedingly abundant the past season (1914) on the foliage of the small-leaved elm (*Ulmus Americana*) to which as early as late June, it imparted a rusty appearance. Trees thus injured have been observed at Batesburg and Columbia, South Carolina, and Laurinburg, North Carolina. During the seasons of 1911, 1912 and 1913 of the Batesburg investigations no evidence of the occurence of this species had been seen. This indicates that the operation of certain factors of natural control must have been suspended during or just prior to the present season. Another observation of interest, is that in spite of the exposure of this species on the top of the foliage very little control seems to be exerted through rains.

Tetranychus banksi sp. nov.

Color rusty-red, from underlying paired organs which occupy all of the dorsal region excepting a median abdominal area and a clear area containg the mandibular plate. Eyes (in mounted material) translucent, directly over suture between coxæ I and II. The usual series of dorsal bristles is lacking, but a series of 18 spatulate-serrate hair-like appendages are distributed on the dorsal aspect of the body as follows: One at either side of mandibular plate anteriorly, one just mediad of each eye, one just overlying each coxa II, six forming a fringe at hind margin of body and three along each side of abdomen. Body of female rhombic-ovate, widest across cephalothorax, exceedingly obese for the size of the legs; cephalothorax rounded generally anteriorly with a slight concave border overlying the palpi: male almost sagitate in outline, conspicuously reduced in proportion to the legs. Mandibular plate about half again as long as wide, tapering somewhat anteriorly, with a distinct emargination and with a superimposed chitinized ridge anteriorly. "Thumb" of palpus subconical, upper surface twice transversely depressed with an intervening dilation, bearing at its tip a long

slender "finger" which is over four times as long as thick; on its upper side arising between middle and tip are two stout hairs, and near the base of upper side arise a reduced "finger" and two stout hairs; the claw of the penultimate joint reaches only to the basal "finger"; a hair arises ventrally from the "thumb", and another laterally from the penultimate joint. Legs of female are of average length barely equalling length of body; those of male are about twice as long as body: femur between four and five times as long as thick—three-quarters again as long as tarsus, tibia somewhat longer than patella which is over twice as long as trochanter: relative length of joints as follows: coxa 9, trochanter 3.75, femur 14, patella 8.75, tibia 10.9, tarsus 8: tip of tarsus not provided with a claw—it being reduced to a vestigial protruberance; the customary series of four capitate hairs arise from the usual point.

Type No. 19089, U. S. Nat. Mus.

The type material from Orlando, Florida, August 16, 1913, from the under surface of castor beans (*Ricinus communis*) and velvet bean leaves. Collected by W. W. Yothers. Evidently allied to *T. latus* of Europe.

NOTES.

Mr. Yothers states that the species is an important pest of the castor bean plant in Florida but that at times it is controlled by a predaceous mite (*Sciulus* sp.) and by the Coccinellid *Stethorus* sp. Larvæ and pupæ of *Arthrocnodax carolina* have been observed on infested castor bean leaves from Orlando, Florida.

An ample series of measurements of material on castor bean from Orlando, Florida, have yielded the following averages:

	LENGTH (exclusive of palpi)	WIDTH	FORELEG
Female	.305 mm.	.267 mm.	.295 mm.
Male	.220 mm.	.197 mm.	.407 mm.

Tetranychus quinquenychus, sp. nov.

There are a number of types of coloration but the general ground-color is reddish-chestnut with the cephalothorax decidedly paler; the prevailing design consists of a large lung-shaped blackish area on each side toward base of abdomen which coalesce medially toward the front, a similar but smaller spot on each side near posterior end of abdomen: legs and mouthparts pale. Body broadest midway between legs II

and III, tapering sharply forward to the narrow, slightly convex frontal margin, also tapering considerably behind, twice as long as broad: bristles rather long and fine, seven each in the dorsal rows and six each in the sublateral rows, frontal pair half as long as subfrontal pair which are placed just in front of the eyes. "Thumb" of palpus very short and stout, on its tip is a blunt "finger" the basal width of which exceeds its length, midway on the upper side is a "finger" equalling the terminal "finger" in length but very slender, at the upper distal corner are two short hairs and two others occur at the upper proximal corner. Mandibular plate of average length with subparallel sides and convex at tip with no emargination. Legs of moderate length; femur I two and one half times as long as broad; tibia I somewhat longer than patella I; tarsus in length equalling tibia and patella together, the tarsal appendages consisting of the usual series of four capitate hairs and a claw which is sharply bent at middle at which point arises distally a strong spur and proximally the usual four claw divisions. There is but a single eye on each side which is set in a shallow submarginal socket directly over coxa II.

Type No. 19087, U. S. Nat. Mus.

Collected at Orlando, Florida, September 28, 1914, on castor bean (*Ricinus communis*), by Mr. W. W. Yothers. This species appears to resemble somewhat *T. tumidus* Banks in the character of the palpus but differs substantially as follows: *T. tumidus*,—body moderately broad: subfrontal bristles not twice as long as frontal pair: only 1 hair on palpal "thumb": sides of mandibular plate narrowed toward tip and concave, tip emarginated: terminal tarsal claw four-cleft. *T. quinquenychus*, body unusually narrow: subfrontal bristles twice as long as frontal pair: four hairs on palpal "thumb": sides of mandibular plate subparallel, tip not emarginated: terminal tarsal claw five-cleft.

MEASUREMENTS OF FEMALE.

Length	.455 mm.
Width	228 mm.
Foreleg	.332 mm.

The relative lengths of the leg joints are as follows: trochanter 10, femur 25, patella 18, tibia 19, tarsus 37.

EXPLANATION OF PLATES.

Plate XLII.

Tenuipalpus bioculatus:

Fig. 1. Front margin of cephalothorax: O, ocular spines; m, median spines; e, eyes (greatly enlarged).
Fig. 2. Female, dorsal view (enlarged 130 times).
Fig. 3. Mouth parts showing left palpus (greatly enlarged).
Fig. 4. Lateral outline of female (enlarged 130 times).
Fig. 5. Tarsal appendages of left leg I, lateral view (greatly enlarged).
Fig. 6. Hind margin of body, dorsal, showing series of 6 spines (greatly enlarged).

All figures were drawn with aid of camera lucida, and figures 3 and 5 were drawn with oil-immersion lens.

Plate XLIII.

Tetranychus yothersi:

Fig. 1. Adult female (from Florida), dorsal view, enlarged 183 times.
Fig. 2. Egg (lateral view) with stalk (from Florida), enlarged 196 times.
Fig. 3. Extremity of left palpus (viewed from outside) showing "thumb", "fingers", claw, and other appendages, greatly enlarged.
Fig. 4. Outline and dorsal pattern of female (from Batesburg), enlarged 151 times.
Fig. 5. Egg (lateral view) without stalk (Batesburg extreme form), enlarged 196 times.
Fig. 6. Tarsal appendages (lateral view) showing onychium, claws, spurs and capitate hairs, greatly enlarged.
Fig. 7. Tarsal appendages (dorsal view), greatly enlarged.
Fig. 8. Adult male (Batesburg form), outline and dorsal pattern, enlarged 129 times.

Figures 3, 6 and 7 were drawn with oil-immersion lens and camera lucida.

Plate XLIV.

Tetranychus banksi:

Fig. 1. Tarsal appendages, a, dorsal view; b, lateral view; greatly enlarged.
Fig. 2. Extremity of right palpus (viewed from outside) showing "thumb", "fingers", claw and other appendages, greatly enlarged.
Fig. 3. Adult male, dorsal view, enlarged 156 times.
Fig. 4. Adult female, dorsal view, enlarged 138 times.
Fig. 5. Front margin of cephalothorax.

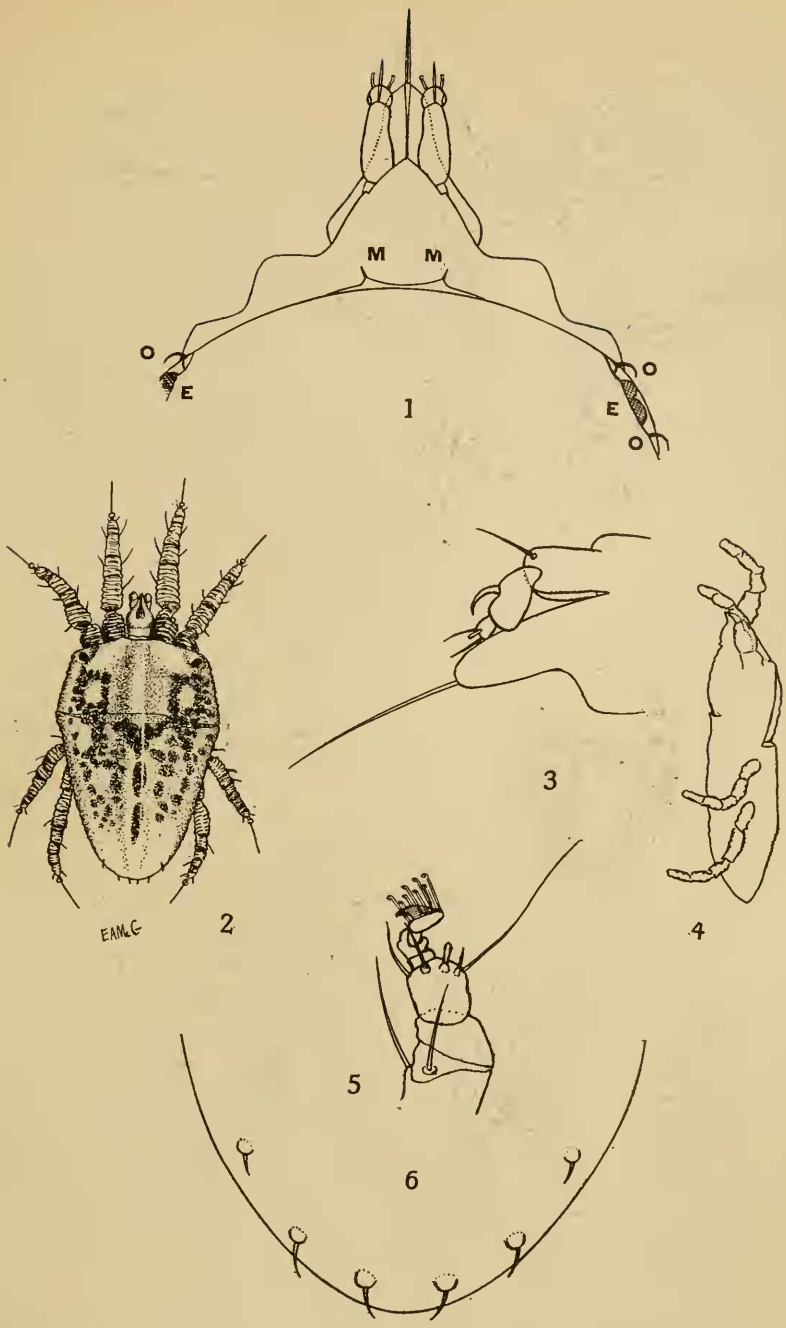
All figures drawn with the camera lucida; figs. 1 and 2 drawn with oil-immersion lens.

Plate XLV.

Tetranychus quinquenychus:

Fig. 1. Tarsal appendages, ventral view.
Fig. 2. Extremity of palpus showing "thumb", terminal "finger", dorsal "finger", "thumb" hairs and penultimate claw.
Fig. 3. Tarsal appendages, lateral view.
Fig. 4. Left eye, seen from above.
Fig. 5. Right foreleg, dorsal view.
Fig. 6. Female, dorsal view (leg bristles not shown).

(Figs. 1, 2, 3 and 4 drawn with oil-immersion lens and camera lucida. Fig. 6 enlarged 150 times.)



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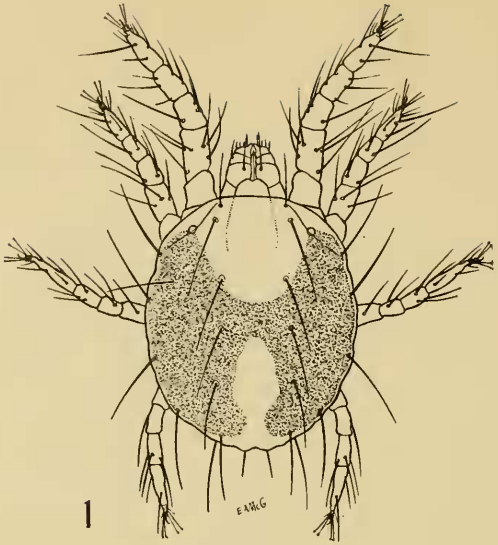

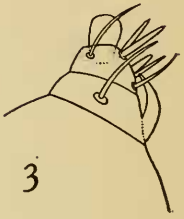

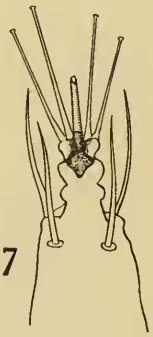

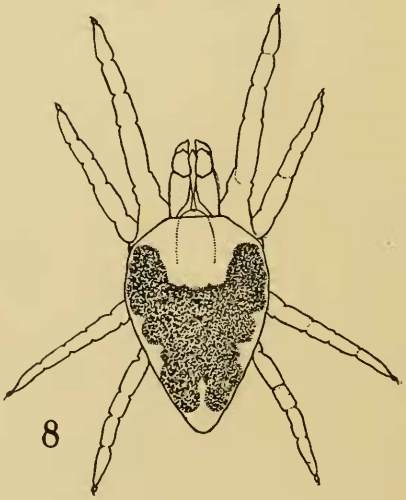

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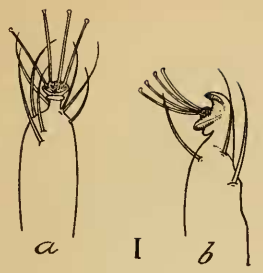

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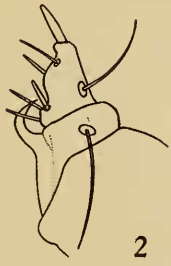

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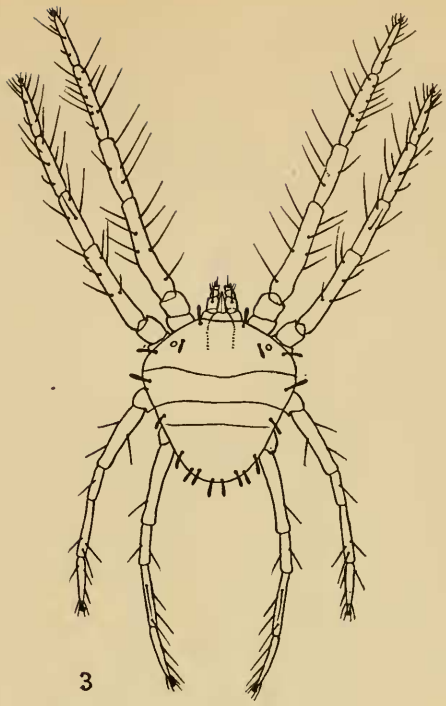

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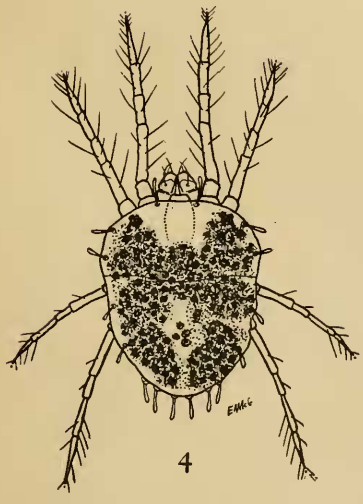

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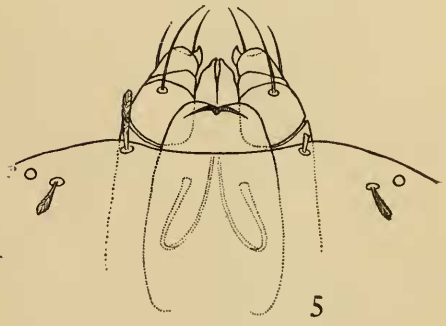

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